KLÜBER LUBRICATION

your global specialist

Detailed information

Manufacturing in accordance with GMP standards.

Speciality lubricants for the pharmaceutical industry

Speciality lubricants from Klüber Lubrication – always a good choice

Stringent requirements

To support you in compliance with the stringent Good Manufacturing Practice guidelines applying in the pharmaceutical industry, Klüber Lubrication has developed special lubricants and has them registered as NSF H1.

The control of contamination risks is a major issue in the GMP guidelines. Contamination means the intrusion of any undesirable materials into a product. Risk control therefore includes all auxiliary substances – including lubricants – which may come into contact with the product in applications where this is technically not always avoidable.

To make manufacturing processes more reliable, H1 lubricants should be used exclusively. This prevents the risk of lubricants being mixed up, and contamination of the pharmaceutical products with non-H1 lubricants becomes impossible.

Clean solutions

All lubricants from Klüber Lubrication listed in this brochure conform with the requirements set forth in FDA 21 CFR 178.3570 and are registered as NSF H1. Furthermore, all our production sites manufacturing H1 lubricants and the H1 lubricants manufactured there are certified by NSF according to the new international standard ISO 21469. This standard lays down hygiene requirements for the formulation, manufacture and use of lubricants that could have unintentional contact with the pharmaceutical product. It also requires the lubricant manufacturers to develop a hygiene strategy with a view to chemical, physical and biological risks in the intended lubricant applications.

In close cooperation with the machine makers, we develop lubricants that are closely tuned to the specified friction- and lubrication points. Due to their excellent performance, the quantity of our lubricants that has to be applied can often be reduced. Exact dosage also supports compliance with the guidelines.

It is normally possible to change over from mineral-oil-based industrial lubricants to high-performance H1-registered lubricants fairly easily provided some basic conditions are met (compatibility of materials, replacement of filter elements, etc.). What has to be observed may differ with each component, so please consult us for advice.

High-performance H1 lubricants from Klüber Lubrication

Speciality lubricants made by Klüber Lubrication help to increase productivity, reliability and economical operation of your machinery. Each of our H1 lubricants was developed with the goal to make it optimally suited for specific application requirements. Depending on the application, the following characteristics were emphasised:

- high resistance to ageing and oxidation
- optimised wear protection
- good corrosion protection
- good water resistance for protection against wash-out during cleaning and additional anticorrosive effect
- good load-carrying capacity

The result is a significant extension of the component life and much longer maintenance intervals, and depending on the application reduced energy consumption. Our experts will be pleased to advise you in detail about which lubricant from our range offers the optimum properties to fulfil the requirements of the application. We also provide product information leaflets on request.

Thorough consulting

For this brochure, we have selected a range of products that have proven successful in applications in the pharmaceutical industry. As a rule, we would always recommend consulting by our experts prior to choosing a lubricant. To optimise your lubricant management, Klüber Lubrication has developed a special service programme called KlüberEfficiencySupport.

Just contact us!

Pharmaceutical processing machines

Pharmaceutical machine	Machine component	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Offers the following benefits for this application
Tablet press	Tablet punches and bronze guides	Klüberpharma UH1 4-220, 4-460	ISO VG 220, 460 acc. to DIN 51519 Service temperature range: –15 °C to 110 °C	Special synthetic oil	– Especially designed for the lubrication of tablet presses, in particular for high-volume production – Good wear protection – Compatible with bronze. No blackening and, therefore, no contamination of tablets with dark particles, leading to a reduction in rejected product
	Tablet punches and guides made of other materials than bronze	Klüberoil 4 UH1-100 N	ISO VG 100 acc. to DIN 51519 Service temperature range: –35 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– For the lubrication of punches made of e.g. POM or special steel
	Main shaft bearing/ rotor bearing	Klübersynth UH1 14-151 [2]	Consistency grade NLGI 1 acc. to DIN 51818 Base oil viscosity acc. to DIN 51562 pt. 1 at 40 °C approx. 150 mm²/s Service temperature range: –45 °C to 120 °C	Synthetic hydrocarbon oils/ aluminium complex soap	– Neutral towards many NBR elastomer types – For universal lubrication of rolling and plain bearings, lifting cylinders, joints, guide bars, guide rails, cam discs. The wide range of applications reduces the number of lubricants used, leading to more transparency and enabling simplified stockkeeping
		Klübersynth UH1 14-222 [2]	Consistency grade NLGI 2 acc. to DIN 51818 Base oil viscosity acc. to DIN 51562-1 at 40 °C approx. 260 mm²/s Service temperature range: –25 °C to 120 °C	Synthetic hydrocarbon oils/ aluminium complex soap	– Neutral towards many NBR elastomer types – For universal lubrication of rolling and plain bearings, lifting cylinders, joints, guide bars, guide rails, cam discs. The wide range of applications reduces the number of lubricants used, leading to more transparency and enabling simplified stockkeeping
	Hydraulic unit	Klüberfood 4 NH1 series	Available in ISO VG 32, 46, 68, 100 acc. to DIN 51519 Service temperature range (ISO VG 32, 46, 68): –40 to 135 °C and (ISO VG 100): –35 °C to 135 °C	Hydraulic oils based on synthetic hydrocarbon oils	– Contains additives improving the ageing resistance; has a demulsifying effect; very low foaming tendency; compatible with many NBR and FPM elastomer types [2]
	Gears [1]	Klübersynth UH1 6 series	Available in ISO VG 100, 150, 220, 320, 460, 680 acc. to DIN 51519 Service temperature range: –25 °C to 160 °C	Synthetic polyglycol long-term gear and high-temperature oils	– Especially for the lubrication of steel-bronze worm gears, but also for all types of spur and bevel gears at elevated temperatures – The excellent friction behaviour of the polyglycol base oil provides energy savings by reducing the power loss and improving efficiency = reduction of costs and CO_2 emissions. In large gears, a measurable reduction in energy consumption can even be achieved – Complies with CLP requirements
	Tool assembly and tablet punch preservation	Klüberoil 4 UH1-1500 N Spray	ISO VG 1500 acc. to DIN 51519 Service temperature range: -25 °C to 120 °C	Synthetic oil	– Facilitates punch assembly – Good corrosion protection for punches during storage – Easy spray application

1) In addition to Klübersynth UH1 6 polyglycol gear oils in the pharmaceutical industry, we offer FDA-compliant Klüberoil 4 UH1 N gear oils based on PAO for normal temperatures as well as the FDA-compliant NLGI 00 grade fluid gear grease Klübersynth UH1 14-1600 . Please do not hesitate to contact us for technical support.
2) Both types of lubricant have proven highly successful in this application. Due to its adhesive qualities and specific consistency, Klübersynth UH1 14-222 improves surface protection. Klübersynth UH1 14-151 is characterised by very good pumpability in centralised lubricating systems. Our experts will be pleased to advise you with a view to the specific parameters of your application.

Pharmaceutical processing machines

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Blister packaging machine	Deep-drawing unit, film-sealing unit and elevation guides near the heated plates unit	BARRIERTA L 55/2	Available in the NLGI grades 0, 1, 2 and 3 acc. to DIN 51818 Base oil viscosity at 40 °C approx. 420 mm²/s acc. to DIN 51562 pt. 1 Service temperature range NLGI 0, 1, 2: –40 °C to 260 °C, NLGI 3: –30 °C to 260 °C	High-temperature grease based on PFPE/PTFE	– Resists to very high operating temperatures up to 260 °C – BARRIERTA base oils are manufactured exclusively for Klüber Lubrication and show excellent long-term stability and high purity level [1]
	Guide rails, racks, drives and cardan shafts	Klübersynth UH1 14-151	Consistency NLGI 1 acc. to DIN 51818 Base oil viscosity acc. to DIN 51562 pt. 1 at 40 °C approx. 150 mm²/s Service temperature range: –45 °C to 120 °C	Synthetic hydrocarbon oils/ aluminium complex soap	– Special high-performance lubricating grease for a wide range of applications – Can be applied by means of centralised lubrication systems. However, due to the many different types of installations and application conditions, pumpability in these systems has to be checked with the manufacturer of the installation in each individual case. We would be pleased to provide support
	Chains [2]	Klüberoil 4 UH1-1500 N Spray	ISO VG 1500 acc. to DIN 51519 Service temperature range of the active agent: –25 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– Easy spray application. The active agent easily penetrates into the chain links due to the aerosol formation. Please refer to the safety data sheets for safe handling methods
	Moulds for the deep-drawing film	PARALIQ 91	Kinematic viscosity at 40 °C 13.0 – 15.6 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: 0 to 120 °C	Ester oil	– Tried-and-tested as release agent for moulds in blister machines used for the deep-drawing of film (bottom film) – Also available as spray for easy application
Cartoning machine	Guide rails, racks, drives, spindles, cardan shafts	Klübersynth UH1 14-151	Consistency grade NLGI 1 acc. to DIN 51818 Base oil viscosity acc. to DIN 51562 pt. 1 at 40 °C approx. 150 mm²/s Service temperature range: –45 °C to 120 °C	Synthetic hydrocarbon oils/ aluminium complex soap	– Special high-performance lubricating grease for a wide range of applications – Neutral towards many NBR elastomer types – Can be applied by means of centralised lubrication systems. However, due to the many different types of installations and application conditions, pumpability in these systems has to be checked with the manufacturer of the installation in each individual case. We would be pleased to provide support
	Chains [2]	Klüberoil 4 UH1-1500 N Spray	ISO VG 1500 acc. to DIN 51519 Service temperature range of the active agent: –30 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– Easy spray application. The active agent easily penetrates into the chain links due to the aerosol formation. Please refer to the safety data sheets for safe handling methods – Also for spindles

1) BARRIERTA L 55 greases are resistant to ultraviolet light and can be used for linear guides exposed to UV light in the pharmaceutical industry
2) We offer a multitude of other FDA-conforming chain oils, e.g. Klüberfood NH1 4-220 N Spray (optimum oil penetration due to medium base oil viscosity), as well as chain oils for high temperatures. Please do not hesitate to contact us for technical support.

Pharmaceutical processing machines

Pharmaceutical machine	Machine component	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Offers the following benefits for this application
Coater, fluidised bed system	Seals (e.g. O-rings) of the spray nozzle	PARALIQ GTE 703	Consistency NLGI 3 acc. to DIN 51818 Base oil viscosity at 25 °C: approx. 1350 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –50 °C to 150 °C	Sealing grease based on silicone oil / PTFE	– Good resistance to media (cold and hot steam, vapour, many types of disinfectants and cleaning agents, solvents) – Good compatibility with many EPDM and NBR elastomer types
Capsule filling machine	Cam mechanism	Klüberfood NH1 94-301	Worked penetration 310–340 0.1 mm acc. to ISO 2137 Service temperature range: –35 °C to 120 °C	Grease based on synthetic hydrocarbon oils, white oil (acc. to EC pharmacopoeia), calcium complex thickener	– Increased component availability and extended maintenance intervals due to good wear protection
Granulating machine	TMG agitator	Klüberoil 4 UH1-150 N	ISO VG 150 acc. to DIN 51519 Service temperature range: –30 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– Good wear protection thus extending the service life of agitators

Machine components	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Offers the following benefits for this application
Compressors	Klüber Summit FG 100...500	Available in ISO VG 32, 46, 68, 100 acc. to DIN 51519 Service temperature range (ISO VG 32, 46, 68): –40 °C to 135 °C and (ISO VG 100): –35 °C to 135 °C	Fully synthetic air compressor oils based on synthetic hydrocarbon oils	– Low maintenance and operating costs due to oil change intervals up to 5000 operating hours in oil-injected screw-type compressors – Low evaporation and carry-over giving long service life of activated carbon filter – Energy savings (reduction of costs and CO_2 emissions) using synthetic hydrocarbons, due to increase in efficiency by 5 % on average
Pneumatic drives	Pneumatic drives have to meet a variety of requirements depending on speed, design, operating temperature and materials (particularly elastomers). We would be pleased to assist you in selecting the lubricant tailored to your pneumatic machine.			

Pharmaceutical processing machines

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Filling machine (for liquids)	Lever in filling station	Klübersynth UH1 64-1302	Consistency grade NLGI 2 acc. to DIN 51818 Base oil viscosity at 40 °C: approx. 1300 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –10 °C to 140 °C	Lubricating grease based on synthetic hydrocarbon oils and silicate	– Good resistance to media allows extended maintenance intervals in contact with cleaning agents – Smooth operation free from stick-slip
	Guides and open sliding points, rolling and plain bearings [1] of feed screws (extruder)	Klübersynth UH1 14-151	Consistency grade NLGI 1 acc. to DIN 51818 Base oil viscosity at 40 °C: approx. 150 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –45 °C to 120 °C	Grease based on synthetic hydrocarbon oils/aluminium complex soap	– High-perfomance special lubricating grease for a wide range of applications – Neutral towards many NBR elastomer types – Can be applied by means of centralised lubrication systems. However, due to the many different types of installations and application conditions, pumpability in these systems has to be checked with the manufacturer of the installation in each individual case. We would be pleased to provide support
	Mixer/piston metering system	Klübersynth UH1 14-222	Consistency grade NLGI 2 acc. to DIN 51818 Base oil viscosity at 40 °C: approx. 260 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –25 °C to 120 °C	Grease based on synthetic hydro-carbon oil/aluminium complex soap	– Also for rolling and plain bearings, lifting cylinders, guide bars and cam discs
	Seals, O-rings for filler heads	PARALIQ GTE 703	Consistency grade NLGI 3 acc. to DIN 51818 Base oil viscosity at 25 °C: approx. 1350 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –50 °C to 150 °C	Sealing grease based on silicone oil/PTFE	– Good resistance to media (cold and hot steam, vapour, many types of disinfectants and cleaning agents, solvents) – Good compatibility with many EPDM and NBR elastomer types
	Chains [2]	Klüberoil 4 UH1-1500 N Spray	ISO VG 1500 acc. to DIN 51519 Service temperature range of the active agent: –25 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– Easy spray application. The active agent easily penetrates into the chain links due to the aerosol formation. Please refer to the safety data for safe handling methods

1) We offer a multitude of other high-performance, FDA-conforming lubricants for rolling and plain bearings, e.g. Klübersynth UH1 14-31 for application in deep-freezing tunnels or Klübersynth UH1 64-62 showing excellent low- and high-temperature stability as well as excellent water resistance. We would be pleased to provide detailed information

2) We offer a multitude of other FDA-conforming chain oils, e.g. Klüberfood NH1 4-220 N Spray (optimum oil penetration due to medium base oil viscosity, as well as chain oils for high temperatures. Please do not hesitate to contact us for technical support.

Pharmaceutical processing machines

Pharmaceutical machine	Machine component	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Offers the following benefits for this application
Peeler centrifuge	Peeling knife/broad-peeling machine (rolling and plain bearings)	Klübersynth UH1 64-1302	Consistency grade NLGI 2 acc. to DIN 51818 Base oil viscosity at 40 °C: approx. 1300 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –10 °C to 140 °C	Lubricating grease based on synthetic hydrocarbon oils and silicate	– Good resistance to media allows extended maintenance intervals even when in contact with cleaning agents
	Deep groove ball bearings and shaft seal	Klübersynth UH1 14-151 [1] Please note: due to the complex requirements, consultation is always necessary prior to lubricant selection.	Consistency grade NLGI 1 acc. to DIN 51818 Base oil viscosity acc. to DIN 51562 pt. 1 at 40 °C approx. 150 mm²/s Service temperature range: –45 °C to 120 °C	Synthetic hydrocarbon oils/ aluminium complex soap	– Neutral towards many NBR elastomer types
Separator	Sealing rings (drum)	PARALIQ GTE 703	Consistency grade NLGI 3 acc. to DIN 51818 Base oil viscosity at 25 °C: approx.1350 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –50 °C to 120 °C	Silicone oil/PTFE sealing grease	– Good compatibility with many EPDM and NBR elastomer types – Good resistance to media (cold and hot steam, vapour, many types of disinfectants and cleaning agents, solvents)
	Lock of drum cover connected to the lower drum part (trapezoid thread)	Klüberpaste UH1 96-402	Consistency grade NLGI 2 acc. to DIN 51818 Service temperature range: –30 °C to 1,200 °C	Fully synthetic base oils/ solid lubricants	– Good adhesion to the friction point, also when subject to humidity – Compatible with high-alloy steels (e.g. A2-70)
Autoclave	Door seal	BARRIERTA L 55/2	Consistency grade NLGI grades 0, 1, 2 and 3 acc. to DIN 51818 Base oil viscosity at 40 °C: approx. 420 mm²/s acc. to DIN 51562 pt. 1, Service temperature range NLGI 0, 1, 2: –40 °C to 260 °C, NLGI 3: –30 °C to 260 °C	PFPE/PTFE high-temperature grease	– Resists very high operating temperatures up to 260 °C – Compatible with most elastomer types – BARRIERTA base oils are manufactured exclusively for Klüber Lubrication and show excellent long-term stability and high purity levels [2]

1) Please note that the centrifugal forces acting on this type of bearing place particularly high demands on the bearing grease. Klübersynth UH1 14-151 has proven successful in certain types of centrifuges. When selecting the bearing grease it should be checked which special grease from Klüber Lubrication performs best under the respective operating conditions (type of centrifuge, speed factor [$n \cdot d_m$] of the bearing, bearing type). Please contact us!

2) BARRIERTA L 55 greases are resistant to ultraviolet light and can be used for linear guides exposed to UV light in the pharmaceutical industry

Speciality lubricants for machine-independent components and special applications

Component	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Offers the following benefits for this application
Mechanical seals, e.g. in agitators	Klüberfluid NH1 4-005	ISO VG 5 acc. to DIN 51519 Service temperature range: –40 °C to 150 °C	Synthetic hydrocarbon oils	– The suitable viscosity for mechanical seals depends on the speed (normal speeds range between 1500 and 3000 rpm). Please contact us! – Neutral towards many NBR and FKM elastomer types
	Klüberoil 4 UH1-15 AF	Oil viscosity at 40 °C approx. 18 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –40 °C to 110 °C	Synthetic hydrocarbon oils	
	PARALIQ P 12	Oil viscosity at 40 °C approx. 20 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –10 °C to 120 °C	Medical white oil acc. to the European Pharmacopoeia	
Valves (double-chamber valves, stop valves etc.)	PARALIQ GB 363	Worked penetration 215-245 0.1 mm acc. to DIN ISO 2137 Base oil viscosity at 40 °C: approx. 2400 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –30 °C to 140 °C	White oil (acc. to EU pharmacopoeia)/ synthetic hydrocarbon oil / silicate	– Neutral towards many NBR and FKM elastomer types [1]
Seal lubrication under hygienic conditions	Klüberfood NH1 87-703 Hyg	Consistency NLGI 3 acc. to DIN 51818 Base oil viscosity at 25 °C: approx. 1350 mm²/s acc. to DIN 51562 pt. 1 Service temperature range: –45 °C to 150 °C	Sealing grease based on silicone oil / PTFE	– Contains an antimicrobial agent which protects against microbial spoilage and contributes to extending service intervals also in critical applications like aseptic filling – Good resistance to media (cold and hot steam, vapour, many types of disinfectants and cleaning agents, solvents) – Good compatibility with many EPDM and NBR elastomer types

1) Additional benefit of PARALIQ GB 363: can also be used for filler components, filters, stuffing boxes, rubber membranes and seals.

Application	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Technical data	Information on composition	Benefits
Universal lubricating oils, e.g. for open slide rails	Klüberoil 4 UH1-1500 N Spray	ISO VG 1500 N acc. to DIN 51519 Service temperature range of the active agent: –30 °C to 120 °C	Synthetic hydrocarbon oils, ester oil	– For metal surfaces – Easy spray application. Please refer to the safety data sheets for notes on safe handling
	UNISILKON M 2000 Spray	Service temperature range of the active agent: –10 °C to 150 °C	Silicone spray	– For non-metallic surfaces like plastic, rubber etc. – Particularly for conveyor belts made of plastic, because the product is compatible with most plastics – Efficient protection against sticking – Easy spray application. Please refer to the safety data sheets for notes on safe handling
	Klübersynth NH1 4-68 Foam Spray	Service temperature range of active agent: –35 °C to 120 °C	Synthetic oil	– Excellent adhesion enables good lubricity and reduced wear – The unique combination of foam and oil enables drip-free overhead application – Optimised consumption due to capillary effect leading to slow but thorough lubricant penetration to the friction point

Maintenance and repair of high-quality manufacturing installations

Application	Problem	Lubricants from Klüber Lubrication, in compliance with FDA 21 CFR 178.3570, NSF H1 registered	Benefits
Corrosion protection	The corrosion resistance of DIN EN 10020 special steel is based on the formation of a very thin passive layer on the steel surface. This passive layer can be destroyed under adverse conditions (e.g. high pH values > 11, chloride ions, leading to intergranular corrosion (welding), crevice corrosion, stress corrosion cracking (e.g. in tube joints) or corrosion fatigue cracking.	Klüberfood NH1 K 32	– Good corrosion protection, even with frequent cleaning – Repels moisture – Also available as spray, therefore easy to apply
Assembly	Particularly in screw connections of the same material there is a risk of cold welding (seizure), which can be prevented by using a Klüberpaste product.	Klüberpaste UH1 96-402	– Facilitates disassembly after longer periods of use – Prevents cold welding in special steel joints – Compatible with high-alloy steels – Excellent water resistance, therefore particularly suitable for friction points subject to moisture (guide rails, hinges etc.) – Prevents fretting corrosion – Protects against corrosion – For high temperatures (upper limit 800 °C, > 200 °C dry lubrication)
Cleaning and maintenance	Cleaning/degreasing spray for the pharmaceutical industry registered as NSF K1/K3	Klüberfood NK1 Z 8-001 Spray	– Rapid and thorough removal of oils, greases, waxes and resin residues – NSF K1 and NSF K3-registered for applications in the pharmaceutical industry – Easy spray application
	Surface cleaning agent for universal use	Klüberfluid NH1 1-002	– Removes oils, greases and waxes from metal surfaces – Evaporates without residues

Notes

The data in this document is based on our general experience and knowledge at the time of publication and is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary field tests with the product selected for a specific application. All data are guide values which depend on the lubricant's composition, the intended use and the application method. The technical values of lubricants change depending on the mechanical, dynamical, chemical and thermal loads, time and pressure. These changes may affect the function of a component. We recommend contacting us to discuss your specific application. If possible we will be pleased to provide a sample for testing on request. Products from Klüber Lubrication are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this document at any time without notice.

Klüber Lubrication München SE & Co. KG
Geisenhausenerstraße 7
81379 München
Germany

Local first-instance court Munich, Germany
Certificate of registration 46624

www.klueber.com

Klüber Lubrication – your global specialist

Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 80 years.

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